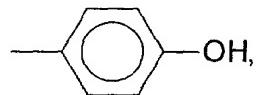
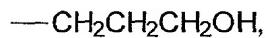


component selected from the group consisting of $\text{C}(\text{CH}_2\text{OH})_3$, a sugar unit, and SiR_3 wherein R is a polar group selected from the group consisting of:

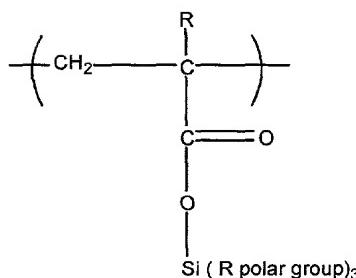
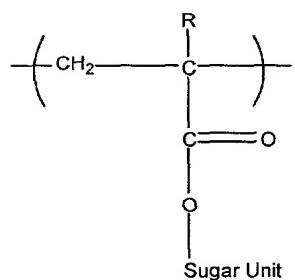
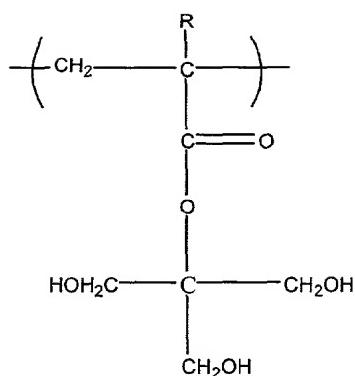


mixtures thereof.

5

One specific embodiment of a polymer that may be used as a positive tone resist is a copolymer of fluoroacrylate having the following comonomer structures:

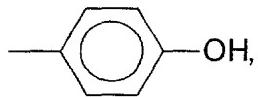
10



5

wherein R polar group is preferably selected from the group consisting of:

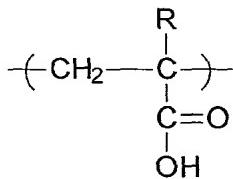
—CH₂CH₂CH₂OH,



—CH₂CH₂CH₂-C≡N, and

mixtures thereof.

- In one embodiment, upon exposure to radiation, the polar group is
5 removed from the unit, thus resulting in the formation of a carboxylic acid unit
that has a higher solubility in CO₂ as illustrated by the following:



- 10 Not intending to be bound by theory, another embodiment that can allow for an increase of the polymer solubility upon exposure to radiation is to employ a polymer that is capable of undergoing chain scission upon such exposure, e.g., an alternating copolymer between a fluorinated alkyl allyl ether with sulfur dioxide. Upon exposure to radiation (e.g., e-beam), scission of the
15 main polymer chain results and thus a lowering of the polymer molecular weight. Therefore, the resulting polymer has a higher solubility in CO₂ relative to the parent base resist of higher molecular weight.

An example an embodiment of a generic phase diagram for a positive resist is given in **FIG. 4**. Above each curve, the polymer (e.g., resin) is soluble